Subject:	Advanced Sensor Network developed for Heathrow Airport incorporates Gill WindSonic Sensors
Reference	AN0017

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Sensor Node deployed around Heathrow Airport

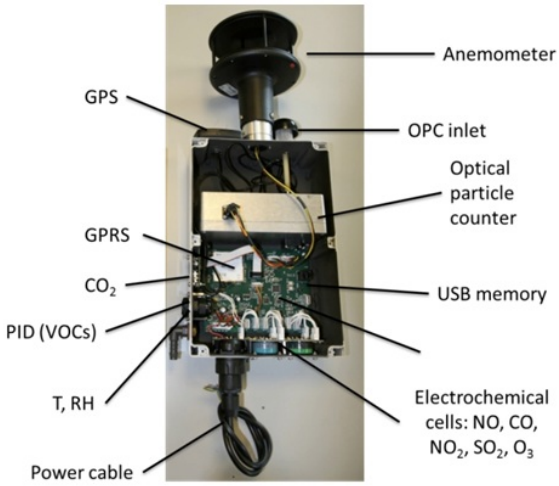
Introduction

The WindSonic ultrasonic wind speed and direction sensor from Gill Instruments Ltd has been integrated into a low-cost air quality monitoring system currently deployed around London's Heathrow Airport.

The new project, led by the University of Cambridge with a range of partners including the Universities of Hertfordshire and Manchester, Imperial College, NPL and CERC and funded by NERC, has involved the development and deployment of a large-scale sensor network to understand and develop sophisticated computer models for air quality in the vicinity of the airport and accomplish the complex task of modelling air pollution within busy urban areas.

Installation

Each of the 50 sensor nodes within the system monitors a range of air quality metrics using field based sensors. The project aims to create advanced large scale sensor networks incorporating the same technical capabilities as larger traditional systems, achieving a greater level of precision in modelling air quality.



Components used within each sensor node

The Gill WindSonic provides critical real-time information regarding wind speed and direction, and is mounted to the top of each node. Other components measure temperature, humidity, levels of gases such as NO, NO_2, CO, CO_2, SO_2, O_3, VOCs and particle sizes of emissions. Built-in GPS positioning and GPRS communication electronics facilitate real-time data transfer.

Why WindSonic?

A critical requirement for the wind sensor was the ability to provide accurate wind direction measurement to identify source attribution, pinpointing the pollution hotspots around the airport. The sensor also needed to be strong enough to withstand the rapidly changing environmental conditions experienced year-round at the airport.

WindSonic is well suited to the changing environmental extremes experienced at the airport. With no moving parts and a corrosion-free polycarbonate construction, the sensors provide reliable operation in harsh and changeable operating conditions without the requirement for frequent on-site maintenance.



WindSonic Sensor mounted to the top of the air quality monitoring system

The sensor will monitor wind speeds up to 60m/s (134mph) and is suitable for operation in temperatures from -35ºC to +70ºC. Importantly, WindSonic is lightweight enough to be mounted to existing structures around the airport and is a viable alternative to typically less-reliable mechanical cup and vane or propeller based systems.

“The WindSonic was chosen due to its robustness, low maintenance with no moving parts and its proven high quality performance” explained Professor Rod Jones of The University of Cambridge, who leads the project. “In addition, Gill Instruments are highly regarded with a reputation for manufacturing high quality, robust wind measurement devices.”

Progress

The installation of the sensor nodes at Heathrow airport is underway, with initial sensor data measurements now being transmitted. The entire system is planned to be fully operational by the end of 2012.



Location of Sensor Nodes positioned around Heathrow

Comment

The Heathrow project represents a new paradigm for making environmental science observations, as the high density of sensors enables a level of precision in air quality modelling that has not previously been possible. It is anticipated that the outcomes of this project will have impact not only in terms of atmospheric science and the way the environment is measured but also more broadly potential legislative implications for maintaining urban air quality standards and its impact on health related issues.